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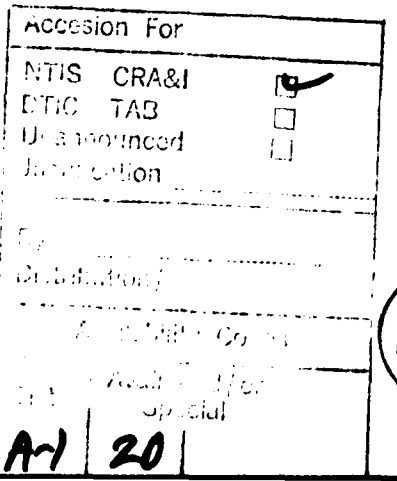

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Patients' retrospective preference for extraction of asymptomatic third molars

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Abstract – The purpose of this study was to determine the personal utility of asymptomatic third molar removal in military patients. From 1 to 30 days (mean = 7.4) after the extraction of one or more third molars, 100 returning patients (all male, mean age = 20.1) were asked to respond to hypothetical questions concerning the extraction of asymptomatic third molars. If the likelihood of third molars ever having to be removed was given as 10%, 50%, and 100%, then 45%, 61%, and 88% of responses, respectively, showed preference for immediate extraction. When respondents chose to delay treatment until there was a problem, no likelihood group would tolerate more than 2.77 additional days of post-extraction pain before changing their preference to immediate extraction. 87% of respondents preferred extractions prior to a deployment which would make treatment delivery difficult, and 89% prior to becoming a civilian at which time treatment might no longer be free. The results indicate general acceptance of the strategy of prophylactic third molar removal among a sample of military patients who have undergone pre-treatment counseling and the surgical procedure. A question remains as to the personal utility that might be measured prior to surgery.

Key words: cost benefit analysis, tooth extraction

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Research on dentist-patient communication has emphasized ways practitioners can influence patients to accept treatment (see 1 for a review of the compliance literature) and has less frequently addressed sensitivity to patients' treatment preferences. GREMBOWSKI *et al.* (2) found that "only about 33% of dentists considered patient factors important in choosing alternative therapies". Aside from financial constraints, patient preferences may be considered of limited importance because practitioners either: (a) believe that patients are uninterested in entering the treatment decision process, preferring to leave it in the hands of experts; or (b) know what is in the best interests of patients and should persuade them in that direction. Two evaluations of this paternalism are found in commentaries by SOKOL (3) and SLACK (4).

Recent evidence and discussion suggests, however, that many patients prefer, or would benefit from, active participation in medical treatment decision making (5–7). But exercising this prerogative is hindered by substantial role-based obstacles between patient and physician (4, 5). Consideration of patient values is more important if there is uncertainty about the best treatment approach (5). Evidence on the prophylactic removal of third molars suggests that this is an area where active solicitation of patient preferences is necessary.

Removal of asymptomatic teeth in one study (8) accounted for 32% of impacted third molar extractions. Aside from orthodontic requirements, justification for these extractions lies in reduced risks for more serious future problems. Recent analysis of expected costs (9, 10) by decision analysis methods (11), however, found that in young patients prophylactic removal was not the most effective disability-reducing strategy. Under a wide variety of assumptions about treatment outcomes and associated disabilities, the risk-minimizing solution was to extract only pathologically involved third molars. This conclusion was subject to the caveat that increases in the severity of outcomes in older patients might be great enough to support prophylactic removal. Unfortunately, the data required to evaluate this possibility were considered to be unavailable.

"Days of standard discomfort" ("defined in terms of the disability normally associated with an uncomplicated surgical extraction of a third molar – namely, pain, swelling, bruising, and malaise", ref. 10, p. 654) were assigned by 46 clinicians to each third molar treatment outcome and this served as the single "cost" value to be minimized. This is appropriate since appreciation of patient discomfort has a central role in the practice of dentistry, but there are other possible considerations. For example, research by one of the same authors (12) on the cost-effectiveness of alternative methods of periodontal disease control considered, besides tooth sensitivity, monetary costs and patients' views on aesthetics and the relative value of present versus future tooth years. These evaluations fall within utility analysis (13), an area of decision analysis that focuses on the determination and incorporation of patient values. The patient provides critical input into the choice of treatment alternatives based on personal preference for outcomes.

With regard to the third molar question, patients may value certain contemporary pain differently than probabilistic future pain. In the present research, pa-

The Naval Dental Research Institute would like you to complete the following questionnaire so we can better understand experiences that patients have when their third molars (wisdom teeth) are removed. You are not required to answer these questions and if you decide not to, there will be no adverse consequences. We believe that your views will provide useful information. Your individual responses will be held in confidence and only study findings for the entire group, without personal identification, will be released.
If you are willing to help us, please continue with this questionnaire.

Fig. 1. Nature of participation.

tients who underwent third molar extraction(s), retrospectively decided between immediate or delayed removal of asymptomatic third molars for a hypothetical patient. These decisions were based on increases in days of discomfort that might result from delay and probabilities that removal would be required in the patient's lifetime. Thus, patients weighed the relative utility of no post-surgical discomfort in the present, against a chance of greater discomfort in the future.

Appreciation of patient preferences in this context should be valuable to practitioners who make recommendations about third molar treatment options with uncertain relative benefits. In addition, incorporation of questions addressing the impact of treatment availability on disability outcomes and mission success were also included as being particularly relevant to the military setting.

Method

Patients who had one or more third molars removed at a Navy dental clinic at the Great Lakes Naval Training Center and were returning for post-surgical evaluation were eligible to participate. These patients represented a group that had consented to the surgical procedures following a conference with the examining dentist. Patient refusals among treatment selected patients were rare.

Information presented to patients before surgery was not rigorously standardized but there was a consensus among the five practitioners who worked during this period with regard to the type of information that should be conveyed to patients. Specific wordings, however, differed between clinicians and for the same clinician on different occasions. The following points were made for the completely asymptomatic case, with appropriate de-emphasis as symptom severity increased: (a) although your wisdom teeth are not now bothering you, they do not appear to be coming in normally and have the potential to cause you problems such as pain and swelling; (b) in boot camp dental treatment is readily available but you may be assigned to a duty station without dental services and painful wisdom teeth could then cause a serious medical problem; (c) this potential problem existed before you entered the Navy and at this time we are trying to give you the best information and best treatment available; (d) therefore, from a preventive standpoint, we strongly suggest that you have your wisdom teeth removed at this time; (e) you will get excellent care at no cost to you and will not have to worry about wisdom teeth complications that may occur if treatment is unavailable.

To qualify for study participation, at least 1 day but not more than 30 days had to have elapsed since the extractions and the patient at this time had to be pain free or suffering no more than mild pain. The voluntary nature of participation in the study was described and the patient was asked to complete a computerized questionnaire. All of 100 patients contacted in this way chose to participate. This selection procedure resulted in an all male group, with a mean age of 20.1 (SD = 2.37), who completed the questionnaire an average of 7.37 (SD = 3.38) days after extractions. Consent conditions were presented again at the beginning of the questionnaire and are described in Fig. 1.

Besides collection of limited demographic data, information was collected on pre- and post-surgical pain, and extraction preferences under various sets of assumptions. Portions of the questionnaire relevant to these items are abstracted in Figs. 2 through 6. In many respects the information conveyed in the questionnaire mirrors that presented during pre-treatment consultation. Notable changes include responding for a hypothetical asymptomatic patient and the presentation of specific probability levels for any future third molar problems, in a situation guaranteeing anonymity.

In contrast to Figs. 2 through 6, the computerized version presented information and requested responses in smaller segments. It seemed easier to interpret and respond appropriately to the computerized questionnaire than to the same questions presented in written format. Subject comprehension of the questionnaire was not evaluated in a pilot study, but mean response values were found to form a logical pattern. Nevertheless, some individuals may have had

1. Had any of the teeth that were extracted, or gums around these teeth, ever caused you any pain or discomfort *before* their removal?
Check the teeth that had ever caused you any pain or discomfort.

_____ Top jaw, left side _____ Top jaw, right side
_____ Bottom jaw, left side _____ Bottom jaw, right side.

Check the worst pain that any of these teeth had caused you *before removal*.

_____ no pain
_____ mild pain
_____ moderate pain
_____ severe pain

Fig. 2. Questions on pain history.

2. Was the pain and discomfort that you had after the removal of your third molar(s) what you expected? (circle the number)

Much less pain than expected			About what you expected			Much greater pain than expected
1	2	3	4	5	6	7

3. For how many days after the removal of your third molars did you have:
severe pain _____
moderate pain _____

* Add the number of days of severe and moderate pain _____ and use this value for answering questions 4 through 9.

* In the computerized version this total was computed by the program.

Fig. 3. Questions on post-extraction pain.

The remainder of this questionnaire deals with hypothetical situations that are unrelated to your particular case and to the facts that your dentist or oral surgeon considered in deciding to remove your third molar(s).
Third molars that have never caused trouble are sometimes removed to prevent future problems. When these problems occur, third molar removal can be more complicated and result in more pain than if they had been removed before problems began or when the patient was younger. We would like to know the trade-offs that patients would make if their third molar(s) did not have to be removed immediately.

In answering these questions, assume that:
* your third molar(s) have NOT yet been removed
* your third molar(s) NEVER caused you a problem before their removal
* dental care is always available to you without delay.

Fig. 4. Instructions and information given to patient.

Suppose it was CERTAIN that one day your third molar(s) would have to be removed because of pain or another problem. You may choose to have these teeth removed now and have the days of severe and moderate pain that you calculated in question 3, or you may delay treatment until after your third molars cause you a problem.

4. By waiting, you will suffer no additional days of severe or moderate pain following third molar removal.
Would you prefer removal: NOW or LATER (circle one)?

5. If you chose LATER in question 4 then decide what number of additional days of severe or moderate pain would make you prefer removal NOW. (For example, the answer "3" says that if waiting until there is a problem means you would suffer 3 additional days of severe or moderate pain after third molar removal, then you would prefer removal NOW.)
_____ Days of additional pain that would lead you to choose removal NOW.
Now suppose it is NOT CERTAIN that your third molars will ever have to be removed because of pain or another problem. Instead of the 100% chance in questions 4–5, the chance that your third molars will have to be removed sometime in your lifetime will either be 50% (1 out of 2) or 10% (1 in 10). You may choose to have these teeth removed now and have the days of severe and moderate pain that you calculated in question 3, or you may wait until if and when your third molars cause you a problem.

6. There is a *50% chance* that your third molar(s) will have to be removed sometime in your lifetime. But if they are removed, you will suffer no additional days of severe or moderate pain by waiting.
Would you prefer removal: NOW or LATER (circle one)?

7. If you chose LATER in question 6 then decide what number of additional days of severe or moderate pain would make you prefer removal NOW.
_____ Days of additional pain that would lead you to choose removal NOW.
(Questions 8 and 9 are repetitions of 6 and 7 with 10% replacing 50%).

Fig. 5. Extraction preferences for three removal probabilities.

In questions 4 through 9 you were assured that dental care was always available to you without delay. If your third molar(s) started to cause you pain, they could be removed immediately.
Now suppose that because of your naval duty you are frequently deployed on small ships or with land forces where a dentist is not available. You don't know when and if your third molar(s) will begin to cause you a problem. If your third molars do cause you a problem while you are deployed you may develop a fever and suffer severe pain for days before treatment can be arranged. You may not be able to perform your duties, you may require a medical evacuation, and your command's mission may be compromised.

10. Assume that you still have all your third molars. Considering possible difficulties in getting treatment, would you prefer to have your third molars removed PRIOR TO DEPLOYMENT or would you prefer to continue to WAIT for a problem? (circle the number).

Strongly prefer removal prior to deployment			Don't care			Strongly prefer to wait until there is a problem
1	2	3	4	5	6	7

11. The dental services for third molar removal that you now get free, would cost you between $200 and $1,000 as a civilian. Would you prefer to have your third molars removed PRIOR TO LEAVING THE NAVY or would you prefer to continue to wait for a problem.

Strongly prefer removal prior to leaving Navy			Don't care			Strongly prefer to wait until there is a problem
1	2	3	4	5	6	7

Fig. 6. Questions related to treatment availability relevant to the military setting.

difficulty in understanding portions of the questionnaire.

Although personal attributes such as ethnic background and educational level might influence the determination of personal utility, this information could not be collected at the individual level in this study. However, mean values for these attributes have been published (14). Among all active duty enlisted Navy personnel, which should not differ substantially from recruits, minorities accounted for 26.7% of the population (16.0% Black Americans; 5.1% Hispanic Americans; and 5.6% either Native Americans, Alaskan Natives, or Pacific Islanders). 91% of Navy recruits during the time frame of this study were high school graduates. Recruits with more or less education than that were uncommon.

Results and Discussion

Half the patients ($n = 50$) reported no pain associated with their third molars any time prior to the extractions. Each patient had one to four teeth removed (mean = 2.11), and of the 211 teeth removed, 45.5% were erupted, 43.6% were partially erupted, and 10.9% were unerupted.

Patients experienced slightly less pain than they expected with the mean score for question 2 being 2.96. On average, patients reported having 1.28 days of severe pain and 1.92 days of moderate pain after extractions.

If the likelihood of third molars ever having to be removed in the hypothetical patient's lifetime was given as 10%, 50%, and 100%, then 45%, 61%, and 88% of responses, respectively, showed preference for immediate extraction. When respondents chose to delay treatment until there was a problem, 10%, 50%, and 100% likelihood groups would tolerate no more than 1.64, 2.77, and 2.76 additional days of post-extraction pain, respectively, before changing their preference to immediate extraction. 87% of respondents preferred extractions prior to a deployment which would make treatment delivery difficult, and 89% prior to becoming a civilian at which time treatment might no longer be free.

Various statistical procedures including stepwise linear and stepwise logistic regression were used to identify significant factors associated with two dependent variables. These were: (a) the

number of days of additional pain that would be tolerated to defer extractions and (b) choosing extraction "now" versus "later". Predictors investigated included presence or absence of pre-surgical pain, differences in post-extraction pain from what was anticipated, actual days of post-extraction pain, days elapsed since extractions, number of teeth extracted, and the removal of unerupted teeth. These predictors could not account for a statistically significant amount of variation in the dependent variables. It is possible that the generally high level of treatment strategy acceptance caused a ceiling effect that precluded the measurement of activity associated with factors that would intuitively play a role in patients' decisions.

In the questions that addressed preference for removal prior to deployment and prior to becoming a civilian, a specific probability for third molar problems was not provided for subjects. The crossing of these two questions with all three probability levels studied in other questions did not seem feasible in terms of additional time requirements and complexity. Therefore a decision had to be made between studying a single selected probability level or leaving the probability unstated. We chose the latter alternative anticipating that subjects would use all available information in generating a personally appropriate subjective probability that would be applied to the hypothetical patient. However, this assumption was not verified and it is possible that subjects may have read a high degree of third molar problem certainty into these questions. It would be informative to replicate these procedures with assigned probability levels.

The results indicate general acceptance of prophylactic third molar removal in a sample of military patients who have undergone pre-treatment counseling and the surgical procedure. Treatment refusal was very rare in this military population, which precludes a significant selection bias. Thus, practitioners can have some assurance that these patients are generally satisfied with their decision and the personal utility that it has brought to them.

Generalization of these findings to populations other than military enlisted recruits would be very difficult in that subjects come from a relatively narrow demographic range. These individuals also self select for the military environment and the acceptance of authority which this entails. Absence of data from individuals who refuse treatment may lead to an overestimation of "average" extraction preference since these persons are likely to tolerate more days of discomfort and higher probabilities of third molar problems before choosing immediate extraction. Issues of generalizability underscore the importance of the personal utility perspective.

The population studied was relatively homogeneous with respect to age, education, and socioeconomic status, and these variables were not considered in explanatory models. Ethnic background is a potentially more interesting predictive variable that could be considered in future work.

In addition to population effects, these preferences may be different if measured prior to extractions. It is possible that patients redefine their attitudes to conform to their own actions which may, at the time of surgical consent, been subject to external pressure. This redefinition would serve to reduce the psychological state of cognitive dissonance by bringing their acts and attitudes into alignment.

In evaluating this potential effect, it would be interesting to present the questionnaire (in modified form) prior to surgical recommendation. This could prove quite awkward in the clinical setting, however, because information conveyed about the "hypothetical" situation may raise questions in the patient's own mind about his case and the completeness of the information that he has subsequently received. The most notable additional information conveyed in the questionnaire is the detailed framing of third molar complication incidence in explicit probabilistic terms. In a broader context this problem raises the possibility of two personal utilities, pre- vs post-surgical, and how these could be considered in reaching a treatment decision. It is also clear that alternative framings of these questions may produce different results (15) and should be investigated.

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The purpose of this study was to determine the personal utility of asymptomatic third molar removal in military patients. From 1 to 30 days (mean=7.4) after the extraction of one or more third molars, 100 returning patients (all male, mean age=20.1) were asked to respond to hypothetical questions concerning the extraction of asymptomatic third molars. If the likelihood of third molars ever having to be removed was given as 10%, 50%, and 100%,

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then 45%, 61%, and 88% of responses, respectively, showed preference for immediate extraction. When respondents chose to delay treatment until there was a problem, no likelihood group would tolerate more than 2.77 additional days of post-extraction pain before changing their preference to immediate extraction. 87% of respondents preferred extractions prior to a deployment which would make treatment delivery difficult, and 89% prior to becoming a civilian at which time treatment might no longer be free. The results indicate general acceptance of the strategy of prophylactic third molar removal among a sample of military patients who have undergone pre-treatment counseling and the surgical procedure. A question remains as to the personal utility that might be measured prior to surgery.